Office of Environmental Health Hazard Assessment (OEHHA) 1515 Clay Street, 16th floor Oakland, California 94612 Attention: Anna Smith, Food Dye Study

Submitted via http://www.oehha.ca.gov/comments

Re: Request for Information on the Neurologic and Neurobehavioral Impacts of Synthetic Food Dyes

## To Whom It May Concern,

I want to start by thanking the members of the California Office of Environmental Health Hazard Assessment for investigating the effects of artificial food dyes on the psychological and neurological wellbeing of children and adults. It is an extremely important topic that needs clarification and understanding. I recognize that there is a lot of opposition to removing artificial food dyes from the food supply, however we owe it to the people of CA and the United States, to understand how these chemicals alter perception and cause neurological and psychological disease in those who are reactive to them.

Let me introduce myself. My name is Dr. Rebecca Bevans. I have a Masters degree in human development, with an area of specialty in child development, and a PhD in cognitive neuroscience, with a specialty in how the body and brain interact to affect perception. I am also a mother of an artificial food dye reactive child. I had no intention of studying how artificial dyes affect children and adults. However when our son's actions and psychological wellbeing became extremely dysfunctional, I had no choice but to find the source of the problem. When you have a seven-year-old who is suicidal, it's not something that you can easily ignore.

When our son was seven years old, we removed Red #40 from his diet. Some of his behavioral issue subsided. Six months later we removed all other artificial colors from his food. He has been artificial dye-free since before his eighth birthday, today he is thirteen. He went from being an emotionally and psychologically imbalanced child to a calm and happy teen. Our story is not this simple, and I urge you to watch my TEDx talk for more details. Our story is heartbreaking with a happy ending, but not all children have the opportunities that our family did. Being a psychologist allowed me to do all that I could for our child. Now I want to do all that I can for every other child suffering from being negatively reactive to artificial food dyes.

I wish I could completely convey to you what it's like having a child who is highly reactive to artificial food dyes, but nothing I can say can truly explain how overwhelming and soul crushing it is to watch your child suffer and not know why. The agony they go through

daily, the emotional extremes, the anxiety, depression, and emotional meltdowns, are more than any child should experience. As parents, we assume that for some reason this is their "normal". But it's not. These are neurotypical children who are reacting to chemicals in their food. And since no one ever talks about how artificial food dyes can affect children, the general public is on its own to figure out what is ailing our children.

It took us about four years to figure out that what was going on with our little one was not typical development. For four years he was suffering. He had issues focusing, his brain buzzed, and some days he presented with ADHD behaviors (e.g. fidgeting, impulsivity, and interrupting). He presented with behaviors similar to Oppositional Defiant Disorder (aggression, outbursts, arguing, and ignoring requests) and Conduct Disorder (destructive and deceitful behaviors). He had mood swings, and extreme emotional meltdowns complete with self-harm behaviors (such as scratching and punching himself), and suicide idealization. He was in extreme emotional pain and by the age of seven, his suffering had escalated leading him to beg to die. No seven year old should want to kill themselves with a knife because they no longer want to feel the way they do. And those feelings were all chemically induced. If it was not for artificial food dyes, he would never have felt that way.

I know that our son is not the only child that is dye reactive. I will admit that most children probably do not react to artificial food dyes, however, there are still too many who do. Currently 7.5 percent of children aged 6–17 are taking some sort of prescription medicine for emotional or behavioral difficulties (CDC, 2018). That is over 5.5 million children. 11% or about 8 million children have been diagnosed with ADHD. Even my Psychology 101 and Abnormal Psychology textbooks state that ADHD might be caused by something that the child eats (Meyers & DeWall, 2018; Nolen-Hoeksema, 2017). About 10% of all children will develop Oppositional Defiant Disorder (CDC, 2018). Doctors and researchers still have no answers as to the cause of this disorder. They think it is environmental and genetic. Conduct disorder affects 1 to 4 percent of children between the ages of 9 to 17. But even if only 1% of the population of children under the age of 18 are negatively affected by artificial food dyes that is almost 1 million kids. One million children suffering because food is artificially colored. Many of these children are then placed on medication, most of which contain artificial food dyes. Over 80% of ADHD medication contain artificial color. I am not in the position to calculate the cost of this needless medication and all the medical visits, as well as the cost to the State of California for all the Individual Learning Plans in the school systems and missed days of school for these children and their parent's loss of income from work. Unfortunately, those most exposed to high

quantities of artificial food dyes are the low income families, as most processed foods are cheap and contain high levels of artificial dyes. According to the National Center for Children in Poverty, approximately 21% of children under the age of 18 years of age live in poverty. This means we have a vulnerable population of children that have an even higher rate of ingesting these dyes.

It is my belief that every child that has been diagnosed with ADHD, oppositional defiant disorder, conduct disorder, anxiety, depression, and mood disorders should be checked for an artificial food dye intolerance. Currently there is not simple test; we are in the process of working on one. However, until we know more about how artificial dyes affect the body, there is only one way to test for an artificial food dye intolerance, and that is to remove all artificial dyes from their diet for two weeks. If behaviors change, then they are artificial food dye reactive. But for parents to know this, they need to be educated. Doctors need to be educated. More research needs to be conducted. More scientists and policy makers need to take this seriously. Too many children are living with this reaction and it is being misdiagnosed.

In April 2016, I delivered a TEDx talk on this topic. You can find the link at the end of this email. This talk allowed me to begin educating parents, education officials, doctors, and researchers. I've received emails, phone calls, and have had countless discussions. The feedback is astounding. We are not the only ones.

I've been contacted by many parents who have told me that removing dyes from their child's diet has made a world of difference in their child's behavior and mental wellbeing. A mother named Carly contacted me with one of the most profound stories that I have ever witnessed. She told me how they were getting ready to put her four-year-old on antipsychotic medication. They were at their wits end. She was unruly and her emotions fluctuated rapidly. She would even talk about killing the members of her family. She was four! Thankfully someone showed Carly my talk and Carly changed her daughter's diet. Within two weeks that their daughter was acting like a sweet little girl. You can find her story here.

https://www.facebook.com/carly.lewisbartee/videos/10154628427442124/. I cannot stress enough, we cannot continue to deny the fact that artificial food dyes have an effect on some children. This is a serious issue.

Earlier I mentioned adults. After my talk I had many people asking me if artificial food dyes have an effect on adults. I have not conducted any official research, however I have spoken to dozens of adults who tell me that they cannot eat artificial food dyes. My husband finally tested himself and has found that if he eats Yellow #5 and/#6, he becomes aggressive and loses

his empathy towards others. His mood changed just from eating Cheetos. Based on the anecdotal evidence, more research into how adults handle artificial food dyes is warranted. If artificial food dyes affect adults similarly to children, imagine how many suffering from anxiety and depression or how many of those who turn violent are actually reacting to artificial food dyes. Could we really be looking at a national epidemic? This can't just be dismissed, it is something worth investigating.

There is a reason why Europe has banned these additives from their food supply. Even the FDA acknowledge that there is enough evidence to support that artificial food dyes do in fact have an effect on children who have not been diagnosed with ADHD. The FDA concluded that: "Exposure to food and food components, including artificial food colors and preservatives, may be associated with adverse behaviors, not necessarily related to hyperactivity, in certain susceptible children with ADHD and other problem behaviors, and possibly in susceptible children from the general population" (Aungst, 2011). Our own government has acknowledged that these dyes can affect some children. However, big business makes money on selling these foods and they don't want to have to change their formulas, even though many of them already have for the European market. Even the American people complained when Fruit Loops took the artificial color out of the cereal saying that it ruins their childhood cereal. We know that it does not change the flavor of the food. We also know that people eat with their eyes, and they don't like change. However none of those are good enough reasons to continue to poison children and adults just because people are uneducated. They don't know. I didn't know. Believe me, I was shocked when I started doing research into artificial food dyes and the effects they have on children. Dr. Feingold knew this back in the 70s and we all dismissed him as preaching pseudoscience. But this negative reaction exists and it is a real issue to those who are reactive. Every YouTube video of a child throwing a fit, all I can think of is that this kid is probably dye reactive because it's exactly what my son looked like. People think that it's a discipline issue. I did. We tried every discipline tactic. It's not a behavior issue, it's a brain issue. It's a chemical issue. The human body is not designed to respond to these petroleum based chemicals. We do not know how these chemicals break down in the human body. We do not know how the metabolites affect the brain and body. More research is needed. Currently we are working with an endocrinologist on what metabolic systems might be affected. Not only does our son have mood changes, he also has some perceptual shifts in his thoughts and thought process. When ingesting Yellow #5 and/or #6, he ends up with racing thoughts, anxiety, agitation, his body temperature increases, and he can't sleep. Not only is his mind agitated but so is his body. Our

doctor thinks that this is due to an interruption in the metabolic process. We are awaiting funding so that we can do further testing. We are also awaiting funding for a positron emission tomography (PET) scan study to investigate the activity in our son's brain when his body is free of artificial dyes and when his body is not. We feel that this image could shed light on what is happening internally to these children.

There is no question that we are poisoning some of our children. Artificial food dyes serve no purpose other than to make processed foods look good. They are petroleum based, toxic, and we have yet to understand how they metabolize in the human body. Research has been conducted but more research is needed. Education is lacking. Doctors are not made aware of the effects of artificial food dyes for some children. The State of California is spend money on treating these children, when what these kids need is a diet free of artificial colors. I implore you to review the current research, demand more research, and stop allowing the food industry to deny that these artificial dyes affect kids.

My hope is that from this investigation, the OEHHA determines that at a minimum, artificial food dyes need to be listed as an allergen, warnings need to be placed on food packaging, and the public made more aware of the possible effect that these artificial dyes may have on their children and themselves. My true belief is that all artificial food dyes should be banned from the food supply, protecting all artificial food dye reactive individuals from ever feeling the negatives effect of these toxic chemicals.

Our family lives about 200 miles from Sacramento and would be more than willing to come talk to OEHHA, or anyone interested in better understanding the effects of artificial food dyes on children and adults. Our son is more than happy to tell his story if it will assist OEHHA in this investigation.

Thank you for listening, and thank you for your efforts to protect children, adults, and their families. To watch a detailed explanation of our story please visit <a href="https://www.youtube.com/watch?v=nQzOHAwCfXs">https://www.youtube.com/watch?v=nQzOHAwCfXs</a> or Google Rebecca Bevans TEDx. I have included a written account of our story at the end of this letter.

Sincerely,

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Our Story:

In 2005 I gave birth to our son. He was a healthy, happy, easy going baby. He was breastfed for a year. We made all his baby food from scratch. He loved to cuddle and often fell asleep on our chests.

As he grew he became a curious infant who developed into a fun and inquisitive toddler. He loved to explore the world and played outside a lot. To get him to come in we would tell him he could vacuum. He loved to vacuum. He was full of life and loved everyone. One of his first words was hug.

By the time he was three he was energetic, enthusiastic, and into everything. Our nickname for him was our "crazed lunatic monkey". We thought that was just who he was. Constantly on the go, into everything and all over the place. He moved fast and wouldn't sit still. He used to look at the camera when we took his picture, and was too empathetic and very social. He never met a stranger and loved talking to anyone who would listen. His self-esteem was fantastic. He had a ton of confidence.

We had him in daycare from about the age of three. He had a hard time at first but he got used being there and he learned to enjoy it. But he had some issues that we passed off as just him being him. Consequently, it was around the age of two that he ate foods regularly that contained artificial colors; fruit snacks, chocolate candies, juices, and such. Since they are allowed in the food supply, and no mention of their possible side effects were ever given, we thought they were safe. Back to his behavior. He would play and have fun but usually was that kid who was at the center of chaos. He would throw something and accidentally hit another child. Or he would spin around and not be aware that he was close to another kid and run into them. He seemed to lose track of his surroundings. If there was a child crying on the playground, my child was either the one crying or somehow involved. We never thought anything of this and just assumed that was who he was. It wasn't until after the removal of artificial food dyes from his diet did we see this disappear.

He was excited to go to kindergarten. During the second week of kindergarten, his teacher pulled me aside and suggested that he had ADHD. I was confused. His preschool never mentioned anything like that. Yes he was interested in a lot of things and yes he was active but ADHD? I called the director of the preschool and we talked. She disagreed that he had ADHD. I called his doctor. His doctor disagreed. He said, "He's just a very bright boy." He attributed all

the behaviors of our son to his intellect. In hindsight I am grateful the doctor didn't try to medicate him. Most ADHD medications contain artificial dyes.

We knew that he could be hyper and enthusiastic. However, he did not act this way every day. Why did it seem like he had these ADHD behaviors only on some days? What was happening to him that caused him to be hyper and impulsive somedays but not others. We thought it was his surroundings. He is a very social kid and we assumed that it must be something in his environment that caused this over stimulation. We thought that maybe it was the other kids that he was reacting to.

In second grade he started having problems. He had a hard time concentrating. It would take hours to do just a few problems of homework. He would get distracted and get up out of his seat several times. One day I asked him to do his best to focus. He looked up at me and said, "I can't concentrate mom, my brain buzzes." Brain buzzes?!? I have a PhD in cognitive neuroscience and if I learned anything in school it's that brains are not supposed to buzz. I knew right then that something internal was causing this brain buzzing and inability to concentrate. I decided that I had to figure out what was going on. I turned to my text books. I looked up scientific research articles. I scoured the Internet. I started looking for answers. And I found them.

I found articles on artificial food dye, Red #40, and how it causes hyperactivity in children (Arnold, Lofthouse, & Hurt, 2012; Aungst, 2011; Bateman, Warner, Hutchinson, Dean, Rowlandson, Gant, Grundy, Fitzgerald, & Stevenson, 2003; Lagakos. And Mosteller, 1981; McCann, Barrett, Cooper, Crumpler, Dalen, Grimshaw, Kitchin, Lok, Porteous, Prince, Sonuga-Barke, Warner, and Stevenson, 2007; Rowe & Rowe, 1994; Schab. & Trinh, 2004; Stevens, Kuczek, Burgess, Hurt, and Arnold, 2011). I found anecdotal evidence regarding Red dye #40 causing ADHD symptoms in some children. They became hyper, fidgety, impulsive, disruptive in class, and caused brain buzzing. It was then that I assumed that the Red #40 was the source of the behavioral issues. We decided to remove everything with Red #40 from his diet. The brain buzzing stopped. He was able to concentrate and we assumed we had found the problem. It was Red #40.

We let him consume foods with other colors like yellow #5 and #6, green #3, blue #1. In hindsight I don't know why I thought those were safe when red #40 wasn't. Maybe because we assumed Red #40 was the problem. His symptoms matched those that I found in the articles and

across the internet. He loved red candies and chose them over other colors. I thought I found the answer.

Maybe I couldn't imagine pulling every food with artificial color in it from our home and his diet. That meant no more colored candies, no more colored cupcakes, no cheesy yellow chips, no suckers, no pickles, no colored breakfast cereals. These food dyes are in many of the processed foods we eat. I guess we just didn't want to take away foods that kids enjoy in their childhood. It seemed overwhelming and since we found the cause of the brain buzzing and hyperactivity we thought that was enough.

Since our 7 year old son wasn't eating red things anymore he turned to yellow things. Cheesy chips, yellow candies, pineapple syrup on shaved ice in Hawaii, you name it, if it was yellow it was assumed acceptable to eat. Seven months after the removal Red #40 we now had a new problem, he was having emotional meltdowns and throwing temper tantrums like I had never seen before. These temper tantrums then turned into emotional fits of rage that became more frequent and more intense. He would become upset over the littlest things. I would ask him to turn off the TV and he would break down and cry. This crying would turn to intense anger and he would through an intense, emotional temper tantrum. He would scratch at his arms, shred at his clothes, swing on me, scream, and eventually it would lead to him begging, "Mom, just get me a knife so I can kill myself. I just want to die." We couldn't believe it. We had a suicidal seven-year-old. All we could think of is if this continued by the time he hit puberty we would lose him.

We wondered what was happening to our sweet boy? So again I scoured the text books, scientific research articles, and the Internet. I found one scientific study conducted by Rowe and Rowe (1994) involving Tartrazine (Yellow #5) and how it causes irritation in reactive children. They state, "They were irritable and restless and had sleep disturbance." On the internet I found more anecdotal evidence regarding the side effects from artificial dyes, like yellow 5 and 6 causing emotional disruptions. We then decided to remove all artificial food dyes from his diet. No more artificially colored foods. If it was naturally colored he could eat it. We started our journey living dye free.

I was not ready for what happened next. The poor child physically and emotionally crashed like an addict coming off of drugs. He slept a lot. He would wake up in the morning and go lay back down on the couch. He was so tired he could not get up. He craved cheese and milk.

He would've eaten an 8 ounce brick of cheese in one sitting if we let him. And he was sore. For the first week it hurt him to be touched. His body ached. He ate and slept. His body was starved and it was finally beginning to recover.

After a few weeks he became more active. He tried playing with other kids but his stamina was low and he could only play for about 5 to 10 minutes before he ran out of energy. It took 3 months for him to physically recover so he could play with the neighborhood kids. It took about 6 months before he was back to himself, the self we had only glimpsed over the years. But the best part was that the emotional fits stopped just days after we removed the yellow #5 and #6 from his diet. To this day he has never again said that he wants to kill himself.

For most of his life he was a pretty thin kid. You could see his ribs through his shirt. The previous year before we remove food dyes from his diet he only gained 4 pounds in that entire year. Following the removal of the food dyes he gained 6 pounds in six weeks. The rest of the year he gained another 10 for a total of 16 pounds. He was fit, healthy, and it became obvious that the dyes were causing some physical metabolic disruptions as well as psychological reactions. We are currently working with an endocrinologist to determine the exact effects on the metabolic system. We are waiting on grant funding to continue the investigation.

Over the last five years we have conducted experimental tests and double-blind tests of these artificial dyes both purposefully and accidentally. About 7 months after living dye free we were eating at our favorite local Thai restaurant. He wanted green tea ice cream but it contained green #3. We had never tested green and he tried to convince me that it would have no effect. Being the researcher that I am I said, "Sure. It's Friday, let's give it a shot." By the time we got home he was extremely hyperactive. He was manic, hyper, euphoric, and unable to sleep until midnight. It became obvious that Green #3 had an effect on our son. It was quick, within 30 minutes, and lasted about 6 hours.

One day we were heading to a play in Los Angeles. He was offered a mint. It contained Blue #1. He once again convinced me that blue had no effect on him. After an hour he was moody, tired, grumpy, and irritated. We have since tried Blue #1 as a double-blind test and the results were the same. He became tired with a negative emotional affect. Blue #3 is also fast acting, within 30 minutes, and seems to last about 6 to 12 hours.

When he was about 10 years old, he had had a rough week. He got into trouble at home, at school, and even at theater rehearsal. We were at our wits end. My first instinct was to get

frustrated with him and blame him for acting up. But his behavior wasn't normal. So I took a step back and looked at what he was eating. We knew he wasn't eating anything behind our backs. He was more cautious than us and read everything. He knew what dyes felt like and avoided them vehemently. So I looked at the not so obvious stuff. That is when the bagel caught my eye. It was from the bakery at a local grocery store. It was an egg bagel and it had a yellow tint. I thought, "Don't all bagels have egg in them? Why is this one yellow?" I called and sure enough, they contained Yellow #5 and #6. He had been eating them twice a week for 3 weeks. That is all it took to cause the agitated behaviors he was exhibiting.

Through trial and error we found that each dye affected him differently. Exposure to the smallest amount of artificial dye caused a reaction. Red #40 makes him hyper, gives him migraines, and makes his brain buzz (a sound in his head like the high pitched screech). His behavior resembles ADHD. The effects last about 2 days. Green #3 makes him manic; hyper and happy. His behavior resembles Bi-polar II Disorder. The effects last about 6-12 hours. Blue #1 causes him to become tired and moody. He gets irritated and grumpy. The effects last 6-12 hours. Yellow #5 and #6 intensifies emotions, increase anxiety, increases agitation, aggravations, and defiance leading to violent outbursts and thoughts of suicide. His behaviors resembles Oppositional Defiant Disorder, Intermittent Explosive Disorder, and Conduct Disorder. The effects of Yellow #5 and/or #6 lasts for approximately five day.

Our son is now 13 years old and is a typical, happy teenager. He is in honors classes, has many good friends, loves theater, and plays video games. We wonder how his life, and ours, would be different if we had never figured out how artificial food dyes were affecting him. Would he be in honors classes? Would he have friends? Would he have been put on medication? Would he even still be here with us? These are thoughts that scare us. I am very grateful that we found an answer.

Since our son was seven, we have done all that we can to eliminate artificial food dyes from his diet. There are the occasional exposures because artificial colors are hidden in so many foods. It would be ideal if we did not need to worry about him eating foods and being exposed to artificial food dyes. It would be wonderful if our food supply in this country was safe for children and adults alike. Until then, we will continue with the way we have lived for over five years. We read labels and ask many questions at restaurants. We will also continue to educate anyone and everyone that we can regarding the effects of artificial food dyes. We speak at

schools. We talk to doctors. And we do what we can to assist those who are suffering as our son once did. No child should suffer because of a chemical that is in their foods. As adults, it is our job to protect these children.

Thank you for listening.

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